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Original Communications.

THE INITIAL RASHES OF SMALL-POX,

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In the abundant literature of small-pox, contained in the standard text-books, and scattered through the various periodicals, mention is occasionally made of rashes occurring in the initial stage of the disease. The reference to them in the ordinary English works on the Practice of Medicine is usually limited t two or three lines, stating that the eruption is sometimes preceded by an erythematous or erysipelatous rash, (see text books of Aitken, Wood, Watson, Niemeyer, Barlow.) Many make no mention whatever of them. (Bennett, Tanner). Even in the special works on the subject the notice is scarcely more extended.

Thompson* refers to a roseolous rash as a common precursor of varioloid.

Munro† speaks of a "rosy efflorescence as in measles preceding the eruption in malignant small-pox."

Gregory‡ makes no mention of them, but refers to a scarlatina-like rash in the progress of the secondary fever.

* On Varioloid Diseases, pp. 35 -151.
† On Small-pox, p. 97.
‡ On Eruptive Fevers, p. 49.

Marson* states, that in varioloid the eruption "is very often preceded by roseola, which lasts two or three days—the r. exanthematica."

Foreign Physicians appear to have paid more attention to them, and very good accounts are to be found in some of the recently translated works †

Many of the older authors believed them to be independent affections, and, according as the eruption was diffuse or mottled, spoke of scarlatina or measles occurring simultaneously with small-pox.

Sydenham was evidently acquainted with them, and refers to the difficulty they may cause in the diagnosis. "The aforesaid small-pox," speaking of the discrete form, "breaks out sometimes after the fashion of erysipelas, sometimes like measles. From these they are difficult to be distinguished even by the practised physician, provided that he goes by the external appearance only."‡

In some of the cases collected by Murchison§ of the supposed coincidence of two fevers at the same time, the mistake has been made of confounding the initial rashes with independent diseases.—(Illustrations, 3, 4, 5, 6, 7, 8, 9, 10.)

Our definite information on the subject dates from the publication by Dr. Theodor Simon of Hamburg (whose premature death last year was a severe loss to the profession in Germany), of a series of articles in the Archives f. Dermatologie und Syphilis, Bds II, III, & IV, on the "Prodromal Exanthems of Small-pox." Other papers on the subject appeared in the same journal from the pens of Drs. Knecht and Scheby-Buch, and less important observations have been published in several of the German periodicals within the past four years.

The probable reason why such scanty reference to them is found in the records of the older epidemics is that they appear

* Reynolds' System.—Article Small-pox.

† Trousseau.—Clinical Medicine (Sydenham Society)) Vol. 2.
Hebra. Skin Diseases, (Sydenham Society) vol. 1.
Ziemssen's Encyclopedia, Curschmann. Art. Small-pox.

‡ Works of Sydenham (Sydenham Society) Vol. 1, page 127.

§ Med. Chirurgical Review, 1859.

with great irregularity, some epidemics, as the one now subsiding, affording numerous instances, others very few.

Two forms of these rashes are to be distinguished, the diffuse scarlatiniform, and the macular or measly, either of which may be accompanied by petechiæ, and occupy a variable extent of the cutaneous surface. In some instances they are general, covering the whole body; as a rule, however, they are limited and show a decided preference for certain localities. This holds good especially for the purpuric rashes, which occur with greatest frequence in the abdominal region, occupying a triangle the base of which is formed by a line drawn from one anterior superior spinous process of the ilium to the other, the sides by Poupart's ligaments, the apex corresponding to the pubis. Another favorite situation is the inner surfaces of the thighs, (the crural triangle of Simon). A third is the lateral thoracic region, in a strip extending towards the navel, along the margins of the ribs. The above are the usual sites for the purpuric rashes, and in the majority of cases they occur in one or all of them. The simple erythematous and macular rashes, unaccompanied by petechiæ, are often much more extensive, spreading over larger areas. When limited, in which case the presence of purpura is common, they occur in the above-named situations, and also, according to Simon, "in the axillary regions, (axillary triangle) the extensor surfaces of the extremities, especially in the neighborhood of the knees and elbows, the backs of the hands and feet, on the genitals, and lastly, as a streak extending from the ankle along the skin over the extensor hallucis longus."

My experience has been that they are chiefly purpuric; in the limited number of cases which I have observed, only two, were unaccompanied by petechiæ. In very many of the cases reported by Simon and Knecht no mention is made of the presence or absence of cutaneous extravasations. Scheby-Buch, on the other hand, believes them to be, in most instances, of an hæmorrhagic nature, *i. e.*, numerous petechiæ occur upon an erythematous base. The following cases will give a good idea of the nature and extent of these initial rashes.

Case I.—D. R., æt. 14. Admitted November 28th. Vac-

cinated, one good mark. Revaccinated 8 days before admission, three points, which had taken, were just passing into the pustular stage. A diffuse erythematous rash of a dark-red hue existed over the abdominal region, extending upwards in the lateral thoracic areas, and downwards upon the thighs. Face much suffused, extremities unaffected. On pressing with the finger upon the skin of the abdomen, numerous petechiæ were evident, most abundant in the groins, and inner surfaces of the thighs.

Temp. 101°. Slight delirium. A papular eruption over face and arms.

29th.—Erythema has disappeared, leaving the ecchymoses visible as small, dark, punctiform spots, closely set together in the groin, and more scattered towards the navel. The largest existed in the lateral thoracic regions, over the serrati muscles. A few were also noticed on the legs about the inner surfaces of the tibiæ.

Course of the Disease.—Eruption became confluent on the face, discrete on the extremities and trunk. Not more than eight pocks appeared on the sites of the erythema. Instead of proceeding to maturation, the majority of the pustules aborted, and on the 11th day of the disease desiccation had begun.

CASE II.—J. C., æt. 23, medical student. Vaccinated, one good mark. Admitted, December 15th, 1874. Initial symptoms, according to his own statements, had been tolerably severe. Papular eruption present on the face and arms. On examining the trunk a fading erythema was noticed over the thorax and abdomen. A diffuse ecchymosis existed over the anterior surfaces of both shoulder joints, extending above over the acromion processes, and internally over the outer half of the clavicles. Continuing into the axillæ, it involved the greater part of the skin in these fossæ, terminating below at the level of the fifth rib. A considerable amount of hyperæmia was present, and pressure with the finger revealed the fact that the ecchymosis was not uniform, but here and there left portions of the skin unaffected.

Numerous purpuræ in the groins and lateral thoracic regions, some of which were of considerable size; none on the extremities, or inner surfaces of the thighs. Temp. 100.5°. General symptoms good. Pulse firm and strong.

Course of Disease.—Pocks numerous but discrete, and proceeded regularly to pustulation. Ecchymoses faded gradually leaving a yellowish-green discolouration of the skin over the shoulders, and in the axillæ. Desiccation early. Rapid recovery. No complications.

The first case affords an excellent example of the condition under consideration. The exanthem occupied the most usual situations, viz., the anterior abdominal and lateral thoracic regions, together with the inner surfaces of the thighs. On superficial examination the ecchymoses were not at first evident, becoming so, however, on the following day, when the erythema had faded.

The second case presents several points of interest. The initial symptoms were so severe, and such was the intensity of the prodromal exanthem, and extent of the cutaneous extravasations, that the gentleman who attended the case, though possessed of considerable experience in small-pox, believed it to be of the true hæmorrhagic variety. On first seeing it I expressed a similar opinion. The remarkable extent of the ecchymoses in the neighborhood of the axillæ was certainly very misleading, more especially, as it was accompanied by an eruption of purpura in the thoracic and lower abdominal regions. Indeed, in such a case, within the first 48 hours, it might be almost impossible to decide definitely, whether we had to deal with a simple prodromal exanthem, or with the initial symptoms of genuine hæmorrhagic small-pox. In the latter the exanthem would probably be more general, of a deeper hue, and present a greater number of petechiæ, and even on the second day hæmorrhage might take place from the mucous membranes.

The two following cases are the only instances which have come under my notice of a simple erythematous rash unaccompanied by petechiæ. Oddly enough, both subsequently became hæmorrhagic; in one the extravasations were limited to the pocks upon the legs, and a good recovery was made; the other proved to be of the true hæmorrhagic variety.

CASE III.—J. M., æt. 25. Vaccinated, one good mark. Admitted, January 28th. Initial symptoms not severe. A diffuse erythematous rash existed over abdominal and thoracic regions. According to patient's statements, it had been brighter, and was fading at time of admission. It was unaccompanied by any purpuric spots, either in the regions affected, or in other parts of the body. Eruption discrete, papular, very scanty upon the abdomen.

Course of Disease.—Progressed favorably, but presented peculiar characters, inasmuch as extravasation took place about the pustules on the legs on the 5th day, and was followed by a subsidence and rapid desiccation of the eruption.

CASE IV.—A. McR., æt. 19, a strong Scotch girl. Unvaccinated. Admitted January 31st, from the general wards, where she had been under treatment during two weeks for some ill-defined affection. Initial symptoms very severe. There was on admission a deep erythematous rash over the whole body, most intense on the abdomen and thorax, and unaccompanied by ecchymoses. Face and arms of a deep red colour. Papules very general. Temperature 103.3°. Pulse, 116. Respirations, 22. Feb. 1st, erythema fading on the trunk.

Course of Disease.—This case proved to be of the hæmorrhagic form, and is interesting from the fact, that a *simple* erythematous rash was among the initial symptoms, the extravasation into the skin not occurring until the third day of the eruption, when the erythema had disappeared.

Patients are usually sent to hospital on the third or fourth day of the disease. The initial rashes are often among the earliest symptoms, and may, if of the simple erythematous variety have disappeared, whereas, if purpuric in character traces of them will remain for days. In some instances, a fading erythema was noticed on admission; in others, no history of any could be obtained, though the petechiæ were present. The following cases illustrate this:

CASE V.—M. C., æt. 15. Vaccinated, one good mark. Admitted Jan. 18th. Initial symptoms severe, well-marked rigor. Temp. 102.2°. Pulse 102. Resp. 24. Only a few papules

visible on the face and about the wrists. Petechiæ on back, sides, groin, and legs. Those upon the back were scattered and small, on the abdomen they were thickly set and large, especially in the hypogastric region. On the lower limbs they existed as small circular spots of dark red colour on the inner surface of the thighs and the extensor surfaces of the legs. In this case I could obtain no history of an erythematous rash.

Course of Disease.—Favorable. Eruption discrete; desiccation early; recovery rapid.

CASE VI.—T. C., æt. 20. Vaccinated, one good mark. Admitted Feb. 16th. Initial symptoms moderate. Eruption discrete, in the papular stage. Abundant petechiæ in the lower abdominal region, and in the groins; also a few over the serrati magni muscles. None upon the thighs, or legs. No trace of an erythematous rash, nor could it be gathered from the statements of the patient that one had existed.

Course of Disease. General symptoms good; pustules formed normally. Purpura faded within the first week.

CASE VII.—T. B., æt. 22. Vaccinated, one good mark. Admitted December 31st. Eruption discrete and in the vesicular stage. Temperature 98.4.° Ill since the 27th. Initial symptoms mild. Numerous small purpuric spots in the groins, arranged chiefly parallel to Poupart's ligaments, and extending internally over the recti muscles. Similar spots, though somewhat larger, existed in a line with the lower ribs, extending towards the navel. According to the statements of the patient, on the second and third day of his illness, there was a rash on the lower abdominal region.

Course of Disease.—Pustules few in number. Recovery rapid.

CASE VIII.—R. W., æt. 20. Vaccinated, one indifferent mark. Admitted Jan. 10th. Initial symptoms mild. A plentiful eruption on face, buttocks, and arms. A diffuse erythema present over the whole trunk, and, in a limited degree, over both elbows. Accompanying this were abundant petechiæ, especially numerous in the groins, the lumbar region behind, and

the posterior surfaces of the the thighs. Jan. 11th. Erythema had disappeared entirely. On the buttocks, back, and extensor surfaces of the arms and thighs, the pustules were collected into small groups.

Course of Disease.—Pustules did not maturate fully; desiccation early. Recovery rapid. This was the only instance in which the initial rash was present on the extensor surfaces of the joints.

Occasionally the initial rash is late in appearing, and may follow rather than precede or accompany the eruption.

Case IX.—H. A., æt. 28. Vaccinated, five good marks. Admitted April 3rd, with a disseminated papular eruption. Initial symptoms had been tolerably severe.

April 4th. At morning visit an erythematous rash, accompanied by numerous petechiæ existed over the lower abdominal regions, and groins. Erythema not intense, petechiæ small, and closely set together.

April 5th.—Rash had disappeared.

Course of Disease. Pustules developed well. General symptoms good. Purpura had faded by the seventh day, leaving light brown discolourations to mark the places where they had existed..

The initial rashes in the foregoing cases, with one exception, (case IV), occurred in the discrete form of variola, and though recovery, as a rule, was rapid, none of the cases could properly (unless, perhaps, case VII), be classed as varioloid. One of the last patients admitted into the Hospital afforded an instance of an initial purpuric rash in the mildest possible form of small-pox.

Case X. W. A., æt. 17. Vaccinated, two good marks. Admitted June 2nd. Eruption scattered, pustules few in number, not more than 30. On admission an abundant purpuric eruption, accompanied by a slight degree of erythema, existed over the lateral thoracic regions, the abdomen, and inner surfaces of the thighs. Between the navel and the pubis was a large superficial ecchymosis, about half the size of the hand, extending in a somewhat semi-lunar form. The purpuric spots

in the groins were of large size, and arranged chiefly parallel to Poupart's ligaments, at a distance from ½″–1″ above them. A few isolated ones extended over them to the anterior region of the thighs, while others existed on the upper third of the inner surfaces.

Course of Disease.—Up on the 5th day.

The last case observed is interesting from the fact that the initial rash took the form of an extensive urticaria.

Case XI.—A. E., æt. 29. Vaccinated, one bad mark. Admitted April 7th. Initial symptoms had been moderate. On examination an eruption was found upon the trunk and extremities which presented the usual characters of urticaria, viz, elevated reddened patches of unequal size, in some places arranged linearly, in others forming broad areas, light in the centre, deep red at the periphery. On the trunk they were chiefly grouped together, being most abundant on the anterior surface, while on the extremities they were arranged in raised lines, the typical wheals of the affection. In the neighbourhood of the ankles and back of the feet they were of large size, and showed better than anywhere else the characteristic features of the eruption. The patient complained of sensations of heat and itching, and wherever he scratched violently a fresh outbreak occurred. A few papules of variola were noticed on the face, and about the wrists.

April 8th—Urticaria persists, though not so marked on the trunk.

April 9th.—Has disappeared from the trunk, and greater part of the extremities; a few only remain about the ankles. At the evening visit no trace of urticaria could be found. Pocks few in number, not more than 60.

Patient got up on the 10th, and remained in the hospital twelve days.

Simon* expresses himself as somewhat skeptical about the occurrence of genuine urticaria as a prodromal exanthem in small-pox, believing that most of the cases described as such should be referred to the macular or measly rashes. I think there can be no doubt about this case, the wheals were

* Loc. Cit.

too characteristic to allow of mistake. A genuine case is also reported by Starck, (Arch. der Heilkunde, Vol. iv.) in which the urticaria appeared and disappeared in different parts of the body in the course of the disease.

Simon calls attention to the fact that the simple macular and diffuse rashes are not unfrequently accompanied by sensations of heat and itching, which in the case of the former might cause them to be confounded with urticaria.

The frequency with which the prodromal exanthems occur is apparently subject to considerable variations, depending, perhaps, on the type of epidemic, which has exhibited marked changes within the present century. The epidemic which has raged in so many parts of the world since 1870 has been of an unexampled severity, owing, in great part, to the large proportion of hæmorrhagic cases, and has been further marked by the very general prevalence of the prodromal exanthems. That no reference is made to them by so many of the old authors, and that such scanty notice is found in the more modern works, can only be explained on the supposition of their infrequence in former epidemics.

In 1088 cases of small-pox observed by Knecht, (Arch. f. Derm. u. Syph. iv), prodromal exanthems occurred in 104 or about 10 per cent. In 1413 cases of Scheby-Buch there were 237 instances of these rashes, or 16¾ per cent.

In 81 cases under my care there were 11 instances, *i. e.*, about 13 per cent. Simon does not give the percentage in his cases, but from the number recorded in his series of articles on the subject it must have been large.

The localities most commonly affected are the anterior abdominal surface, and the inner surfaces of the thighs. Thus in Scheby-Buch's 237 cases these regions were affected in 190 instances. In the few instances which have come under my notice, the lateral thoracic areas were more frequently the seat o the exanthem than the inner surfaces of the thigh; nor did I observe any cases in which the rash was absent from the anterior abdominal regions. Many cases are recorded in which the exanthem remained limited to the regions of the joints,

(elbows and knees), or the backs of the hands, the axillæ or the inner surfaces of the thighs, without the simultaneous affection of the abdominal surfaces. When confined to the extremities, both upper and under are implicated as a rule, the rash is rarely limited to either alone. Occasionally they are unilateral, in which case they are always of small extent. The general erythematous rashes are rare; in Scheby-Buch's 237 cases there were only 14 instances. Neither of the above mentioned authors state the proportion between the simple erythematous rashes and those accompanied by purpuric spots. Indeed, in the reports of many of Simon's cases no mention is made of their presence or absence. In the 11 cases which have come under my notice the latter greatly exceeded the former, the proportion being 8 : 3.

A consideration of the diagnostic and prognostic value of the initial rashes is of great interest: for, of course, the worth of a symptom is in direct ratio to the amount of knowledge it gives us in deciding upon the nature of a case, and forming an opinion as to its probable issue.

From the fact that a patient is rarely or never sent to Hospital until the characteristic eruption has made its appearance, *i. e.*, on or about the fourth day of the disease, none of the above cases were of any service to me in forming a diagnosis; that had already been made. In any case the value of the initial rash depends greatly on the date of its outbreak, which extends from 1 to 5 days before the appearance of the eruption. In the majority of cases it comes out on the second day, and if of noticeable extent would consequently be of diagnostic importance, more especially if accompanied by petechiæ. Indeed, Curschmann* states that in the initial stage of the disease there is only one pathognomonic symptom, and that is, the hæmorrhagic exanthem situated in the triangle of the thigh. The petechial rash is of much greater diagnostic value than the simple erythematous, and a case of fever presenting an eruption of purpura in any of the above oft-named localities on the second or third day should be looked upon with grave suspicion. Simon maintained that even before the onset of the fever, and prior to

* Loc. Cit.

the general disturbance of the system, the diagnosis could be determined by the appearance of the characteristic prodromal exanthem. This is going very far; still, he has recorded two such cases, and quotes two others. In his 38th case there was an initial rash in the inguinal regions, and about the anus, for the greater part of a day before the onset of the fever and constitutional disturbance. The former set in with a rigor, and was followed by a great extension of the exanthem. It is to be remembered that prodromal rashes are not peculiar to small-pox, though, no doubt, they occur with much greater frequence in this disease than in any other. Scheby-Buch states that he has met with simple erythematous rashes in the initial stage of tonsillitis, typhoid fever, and measles, presenting the same distribution, and differing only from those of small-pox in intensity and extent. Purpuric rashes, however, are excessively rare, if they occur at all, in the first stage of the ordinary febrile affections; so that they are of chief moment among the prodromal exanthems of small-pox, and may be regarded as affording a tolerably certain basis for diagnosis. The general erythema, which is met with in a limited number of cases, is usually of the diffuse form, and, occurring on the second or third day, might be confounded with scarlatina. The points to be attended to in the diagnosis would be, the mode of attack, which in the two affections presents certain differences; the colour and extent of the exanthem, which is brighter in scarlet fever, and, as a rule, much more extensive; and lastly, the presence of minute petechiæ in the inguinal regions would be in favor of small-pox.

The diffuse erythema accompanied by numerous petechiæ which occurs on the second or third day in cases of malignant small-pox, could not be distinguished from the similar condition met with in those rare cases of hæmorrhagic scarlatina. The presence of an epidemic of one or other disease would be the only means of deciding the nature of the case.

Simon regards the prodromal exanthems as eminently characteristic of small-pox, and among his cases, which are all of great interest, we met with some of special significance. Thus in the case of a girl who had had a rigor, fever, pains in the back and

head, and initial rashes in several places on the extremities, though no eruption followed, the diagnosis of small-pox was made, and confirmed by the fact that the sister, who had acted as nurse, took the disease badly. He also records cases in which, with the outbreak of the prodromal exanthem, the temperature sank and the general symptoms subsided, coming on again with the appearance of the eruption, and finally subsiding on its completion. Whether from a diagnostic point of view we agree with this author's estimate of the value of these initial rashes or not, there can be very little doubt that in a limited number of instances they may be of considerable service, in enabling us to decide upon the nature of a case, and therefore take early precautionary measures for the isolation of the patient.

Of the value of the initial exanthem in the prognosis of the disease the opinions of authors differ. Simon makes the general statement, that, "among the severe and fatal cases of variola just as many were accompanied with prodromal exanthems as those without," and he regards their prognostic significance as *nil*. It struck me, however, in reading over his cases that the number of deaths was comparatively small.

Knecht in 115 fatal cases of small-pox met with the initial rashes only 15 times, and as this observer noted 104 instances his experience supports the view that they are, on the whole, of favorable significance. He states that up to the 30th year they are of no prognostic value, but after this age they indicate a severe course, while in old age they are almost invariably of evil omen.

Of Scheby-Buch's 237 cases, 37 died; *i. e.*, about 15 per cent. His experience does not bear out Knecht's supposition, that after the age of 30 the prodromal exanthems are of serious import. Curschmann believes that the simple macular and erythematous rashes almost invariably precede varioloid, and states, that in many instances the number of pustules was in inverse ratio to the extent of the initial rash. On the other hand, the purpuric rashes, in his experience, especially those in the regions of the groin, are almost always followed by variola vera. The 11 cases above reported do not support the view; the only

fatal case among them was preceded by a simple erythematous rash of considerable extent and the other instance of an erythematous rash was not followed by varioloid. Not one of the eight instances of initial purpuric exanthem proved to be variola vera; they were all followed by the milder forms of the disease, two of them being varioloid.

Trousseau* states that while in natural small-pox the scarlatiniform rashes accompanied with purpura constitute alarming symptoms, they do not lead to an unfavorable prognosis in the modified form.

Professor See† believes that the scarlatiniform and rubeolic rashes precede as a rule benign cases, the hæmorrhagic variety the severe.

Hebra‡ holds that the appearance of the rash upon the abdomen is not "necessarily to be regarded as an unfavorable sign. These cases do, however, more often terminate badly than in recovery, and particularly when the affection passes beyond mere hyperæmia into hæmorrhage, when, in fact, a purpura rather than an erythema shows itself on the abdomen and on the thighs."

On the whole the presence of initial rashes in the majority of cases indicates a favorable termination, but it is evident from the foregoing statements that we cannot as yet lay down definite rules with reference to their prognostic value. In forming an opinion we must not rely on the nature and extent of the exanthem alone, but take into account the general symptoms, not, as Sydenham says "go by the external appearance only."

The prodromal exanthems it may be remarked occur with much greater relative frequence in men than in women.

A debated point has been, whether the small-pox eruption ever appears on the regions which have been affected with the initial rashes. In very many instances these parts present an entire immunity, which may be owing to the fact that the rashes occupy just those regions most commonly spared by the small-

* Loc. Cit., Vol. 11, p. 71.
† Journal de Medicin, Juin, 1875.
‡ Skin Diseases, Vol. 1, p. 58.

pox pustules. The lower abdominal and inguinal regions are rarely the seats of an abundant eruption, and often remain free, while the rest of the surface is involved to a considerable extent. I have several times seen isolated pustules develop in the hypogastric region after an initial rash.

Most authors refer the phenomena in question to disturbances in the vaso-motor nerves, caused, Simon supposes, by hyperæmia of the cord, which affects injuriously the vascular nerves, passing down from the medulla. "If," in his own words, "the affection of these nerves is wide-spread an erythema universale follows, while if limited to certain groups we notice circumscribed erythemas; and, as the chief site of the affection (hyperæmia?) of the spinal cord is in the lower dorsal and lumbar regions we have in the majority of cases the erythema confined to the lower parts of the trunk."

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HÆMORRHAGIC SMALL-POX.

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True hæmorrhagic small-pox occurs under two conditions; in one the characteristic symptoms come on early, either with or following close upon the prodromata; there are extensive cutaneous extravasations, with hæmorrhages from the mucous surfaces, and death ensues with a terrible certainty in from two to six days. This is the *purpura variolosa* of authors, the petechial, malignant, or black small-pox. In the other, the case progresses as one of variola vera, and it is not until the vesicular or pustular stage that hæmorrhage takes place into the pocks, and in some cases from the mucous membranes. This, which is almost as invariably fatal as the former, has been called by some writers, *variola hæmorrhagica pustulosa*, indicating that the hæmorrhages occur at a later period of the disease.

The epidemic which has raged in this city for the past five years has been remarkable for the prevalence of this variety of the disease; and the present paper is based on 27 cases, 14 of which came under my own observation, chiefly at the General Hospital, while the remaining 13 were under the care of my predecessor, Dr. Simpson, to whose kindness I am indebted for

permission to utilize them. The clinical history of the disease is well exemplified in the reports of the following cases.

I.—A. T., aged 6½, unvaccinated. Admitted at 2 p.m., July 14th. Had been ill since the afternoon of Monday, the 10th, with fever, severe pains in the back and head, and vomiting.

Patient seen at 8.40 p.m. Pulse 144, tolerably firm; temperature 105°; respirations 26, the rhythm broken by an occasional deep inspiration, or a series of shorter ones. Pupils dilated. Slight delirium. Tongue thickly coated, white, edges red. General cutaneous surface of a dusky red colour, especially marked in the face, and by careful inspection an exceedingly fine papular eruption was discovered, most evident on the face, less so in other parts. Scattered over the whole skin were numerous ecchymoses, from 1 to 3 lines in diameter, and of a dark red colour. They were most abundant about the neck, in the submaxillary regions, scattered on the extremities. A thickly-set group existed over the left biceps. Ordered quinine gr. x, at 9.30. Very restless all night, raving and shouting; temperature at 3 a.m., 104.1°, and at this time he had a second ten grains of quinine, shortly after the administration of which he vomited a little blood.

15th.—9.15 a.m. Pulse 140, not so full; temperature 104°; respirations 18, and still irregular. Is sensible, but will not take nourishment. Ordered a cold pack. At 12 a.m., temperature 103°. 5.30 p.m. Pulse 144; temperature 104.2°; respirations 32. On the back are many elevated wheals, and on the summit of these small groups of vesicles exist. The fine punctiform extravasations are almost universal on the skin of the trunk. Lips dry and cracked. Tongue darkly coated. Does not complain of his throat. Ordered a cold pack at 6 p.m., and quinine gr. x, at 9 p.m. To have morphia if sleepless.

16th.—Has been very restless all night, in spite of two draughts of morphia (¼ gr. each). Pulse 140, weak but regular; temperature 103.2°; respirations 18, more regular Great restlessness and jactitation. The scattered papules are uniformly hæmorrhagic, and the wheals on the back and side,

which yesterday were only hyperæmic, are now purpuric. At least one half of the cutaneous surface is the seat of extravasation and the free portions are of a dusky-red colour. Purpuric spots numerous about the face, and a few exist beneath the conjunctiva. The urine passed through the night is clear, though scanty. Has passed a considerable amount of blood per rectum, and also a small quantity of bloody urine. Surface of body darker, extravasations appear deeper and more abundant; on exposing the trunk, nothing is noticeable on the skin but the deep plum colour. Restlessness extreme, and slight delirium.

According to the nurse he became easier after 3 p.m., passed more blood from the bowels and bladder, and died at 5.30 p.m., having been in hospital a little over two days. Duration of illness about six days.

The above may be taken as a fair example of the disease in question, but it may occur in a more aggravated form, killing in from three to four days, and before the eruption has become at all evident.

One of the worst cases which came under my notice was of this description, and, as I saw it very frequently from the beginning to the close, I will give a short account of it.

II. On the evening of Thursday, Oct. 24th, 1874, I was sent for to see A. N., aged 22, a stout, well-built, young Englishman. I found him in a high fever, complaining of intense pain in the lumbar and præcordial regions, and incessant vomiting. He stated that he had been to the theatre the previous night feeling in his usual health, but that on awaking this morning he felt unwell, had a headache and nausea, and was unable to attend to his business. He believed it to be biliousness, to attacks of which he was, at times, subject. On the left arm were two scars of an old vaccination.

25th, 9 a.m. — Found him in the same condition, having passed a very bad night. The vomiting and pains continue. Temperature 101°; pulse 116, full and strong; face flushed, skin of chest erythematous. The præcordial pain was specially

grievous, and I gave him an injection of ½ a gr. of morphia in this region.

12 a.m. — Is a little easier, but the retching continues.

4. 15, p m.—Skin of the trunk very hyperæmic, and a few isolated ecchymoses were noticed along the lower margins of the chest.

9. p.m.—Scattered spots of purpura exist also in the groins. Condition much the same, retching not quite so frequent. Pulse 112; temperature 102.4°.

26th.—Passed a restless, uneasy, night. Skin of trunk much congested, that of extremities less so. Ecchymoses have extended, and are more numerous. In consultation with Dr. Howard in the afternoon, my suspicions were confirmed, and the diagnosis of small-pox made. On careful inspection a few small papules were discovered upon the wrists and forehead, near the roots of the hair. Still complains of the dull, aching pain in the back, and the vomiting continues every 15 or 20 minutes. In the evening he was removed to the small-pox wards of the General Hospital, and placed under the care of Dr. Simpson. Shortly after arriving there he vomited a little blood. 9. p.m.—The skin of the trunk is now almost universally purpuric, and the extravasations are extending on the extremities. Pulse 124, soft and compressible; respirations 26, interrupted, every fifth or sixth inspiration deeper than the others. Complains a little of his throat; soreness due probably to the constant retching. Still complains of the dorsal pains. A hypodermic injection of morphia was given in the lumbar region.

27th.—Passed a restless night. Hæmaturia and melæna towards morning. Hæmatemesis at intervals. Considerable oozing took place from the puncture of the hypodermic needle. General symptoms a little improved. The lumbar pains much relieved. Cutaneous hæmorrhages are extending on the extremities. Pulse 140, and small; respirations 34; temperature 100.2°. Hæmorrhages from the bowels, stomach, and urinary passages continued through the day, and the symptoms became aggravated. 6 p m.—Pulse 140, and

almost imperceptible; respirations between 40 and 50, and interrupted. The mind, which up to this time had remained clear, now began to wander. The greater part of the skin of the body is ecchymotic. The face is somewhat swollen, dark purplish red in colour, and on pressing with the finger it is seen that colouration is due chiefly to the extravasations, which have also occurred round the orbits. The conjunctivæ are swollen and black, hæmorrhage having taken place beneath them; the corneæ appear sunk in dark red pits, giving to the patient a frightful appearance. The whole trunk is of a deep plum colour, hardly a trace of clear cuticle remains. The purpuric spots are thickly set, and between them are fine punctiform extravasations. On the extremities the petechial eruption is more scattered; still, even here, more than two-thirds of the cutaneous surface is the seat of hæmorrhage, and the whole skin is hyperæmic. The most careful inspection fails to detect any papules, even about the wrists or forehead, where on Friday evening they were appearing.

Just after midnight the respirations became more prolonged, pulse quite imperceptible, extremities cold, and death took place at 12.45 a.m.,on Monday morning. The whole illness lasted hardly four days.

With the exception of two, all the cases of hæmorrhagic small-pox which I have observed were of the above type—the patients died before the characteristic eruption developed, or the cutaneous ecchymoses completely cloaked it. In two instances the extravasations did not come on in the initial stage, but during the development of the pocks.— *V. hæmorrhagica pustulosa.*

The following is a brief history of one of these cases:

III. A. McR., aged 19, a well-built Scotch girl, unvaccinated. Admitted January 31st, 1875, from the general wards, where she had been under treatment during two weeks for some ill-defined affection. Only six weeks previous to this she had been discharged from the Hospital convalescent from typhoid fever. In the general wards she had suffered with the usual initial symptoms of the disease. On admission, temperature 103.3°;

pulse 116; respirations 22. A deep erythematous rash exists over the whole body, most intense on the abdomen and thorax, unaccompanied by ecchymoses. A papular eruption is present on the face, thorax, and arms, and is just appearing on the legs. Patient dull, heavy, and does not respond to questions.

Feb. 1*st.*—9 a.m.—Temperature 102°; pulse 110; respirations 26. Has passed a restless night; delirious at times, vomiting continues at intervals. Erythema persists. 6. p.m. Pulse 112; respirations 32; temperature 103.4°. Towards the afternoon the nurse states that a small amount of blood was vomited, and she also passed a little from the bladder and bowels. The eruption has extended, many of the papules have now vesicular tops. The erythema is not nearly so bright.

2*nd.*, 9 a.m.—Temperature 102.3°; pulse 100; respirations 26. The hæmatemesis has continued at intervals through the night. Slight hæmaturia. The bright erythematous rash has gone, the skin is now of a dusky livid hue. 6. p.m. Temperature 103.4°; pulse 60, and intermittent every fourth beat, but is tolerably full; respirations 28. Cutaneous extravasations noticed for the first time, chiefly about the vesicles on the upper part of the chest, and on the legs. In many the hæmorrhage has occurred into the vesicles. The hæmorrhages from the mucous membranes have continued at intervals.

3*rd*, 8.30 a.m.—Temperature, 101°; pulse, 112; respirations, 24. Most of the vesicles on the legs are now hæmorrhagic, and the ecchymoses have extended in the abdominal region. The vomiting is still a very troublesome symptom. 5.30 p.m.—Pulse, 120, not irregular; temperature, 102°; respirations, 24. On the face and arms the pocks are developing slowly, and only a few in these parts are hæmorrhagic; melæna, hæmaturia and metrorrhagia (slight). Takes nourishment well.

4*th*, 9. a.m.—Pulse, 120; temperature, 101.2°; respirations, 28; says she feels better; vomiting has stopped. Blood in the urine passed through the night. Pocks are not developing, look dark, and the majority of them are hæmorrhagic.

6. p.m.—Pulse, 124; temperature, 102°; respirations, 36. The peculiar variolous odour very evident this evening.

5*th*, 8.30 a.m.—Pulse 116; temperature, 100°; respirations, 18. Slept well, and says she feels much better. Melæna and hæmaturia through the night. Pocks much flattened at the top, and of a dark colour; skin between them livid, and covered with minute extravasations. 6 p.m. Pulse, 112, very weak and intermits every tenth beat; temperature, 101°. Is very dull and heavy, and does not care to take nourishment. Not much change noticed in the eruption, the majority of the pocks look like elevated hæmorrhagic papules, no umbilication in any of them. Through the evening she lost a good deal of blood from the vagina, got much worse towards morning, and died at 7 a.m., on the 9th day of the disease.

The details of the above cases furnish a tolerably accurate picture of the clinical features of this truly terrible disease, and I shall now proceed to make some general remarks upon its symptoms, diagnosis, etiology and pathology.

Symptoms—Satisfactory evidence is wanting as to the period of incubation in hæmorrhagic small-pox. Most writers state that it is the same as in the ordinary form, *i. e.*, 12 to 14 days. Zulzer,* however, states that it is shorter, having determined it in 9 cases to be from 6 to 8 days. In the majority of instances it is unaccompanied by any symptoms—perhaps slight languor and malaise—the disease breaking out suddenly in all its violence. So it was in the case above reported of the young Englishman. The day before the attack he had walked round the mountain, (5 miles).

The symptoms of the initial stage are those of the pustular form; indeed, the disease may be regarded as an intensified and prolonged initial stage, combined with a remarkable tendency to cutaneous and mucous hæmorrhages.

The fever, pain in the back, and vomiting—that triple combination, which we look upon as almost pathognomonic of small-pox—are the prominent symptoms throughout, even after the characteristic extravasations appear.

* Berliner klinische Wochenschrift, 1872.

The fever is usually moderate, varying from 101° to 103°; only once did I observe a temperature of 105°. It is frequently ushered in with a rigor, or series of chills. The pain in the back is perhaps the most distressing symptom to the patient, and persists longer, and is more constant, in this than in the pustular form of the disease, continuing in some instances to within 12 hours of death. All of my patients complained of it, and when asked to localize it placed the hand over the sacrum. Præcordial pain was also common, in one or two cases much more severe than the dorsal. Headache is rarely absent during the first days of the fever.

Vomiting constitutes a very troublesome symptom, and, in my experience, proves exceedingly obstinate, much more so than in ordinary small-pox. It was very unusual for patients with the latter disease to vomit after the appearance of the eruption, while, in cases of the hæmorrhagic form, it continued for 3, 4, and 5 days. Dry retching was frequently combined with it, and seemed particularly distressing.

Early on the second day, or even in the most severe cases on the evening of the first, a bright scarlatiniform redness spreads over the skin of the trunk, sometimes extending to the extremities, but not often involving the face. In some instances this is not universal, but confined to the lower abdomnial or lateral thoracic regions. It is difficult, or even impossible, to distinguish this general or localized erythema preceding hæmorrhagic small-pox from the similar condition which, as an initial rash, so frequently ushers in the ordinary or modified forms of the disease. For a time simply hyperæmic and disappearing on pressure, the character of the rash quickly alters by the occurrence of numerous extravasations, which begin commonly in the groins and lateral thoracic areas. At first punctiform or macular, and concealed by the general redness, they soon increase in size, and on the trunk form irregular patches, ranging in size from a six-pence to a penny, while on the extremities and face they remain discrete. In 36 hours the ecchymoses may have developed to such an extent as to involve fully two-thirds of the cutaneous surface. The skin of the trunk is now of a rich plum

colour, and by pressure very slight difference is made in the intensity. Hæmorrhage into the tissue of the eyelids and beneath the conjunctivæ is common, and adds greatly to the disfigurement of the face, already puffed and swollen. The extravasations deepen until the end, forming throughout the most distinguishing feature, and the one which has so justly given the name of black small-pox to this variety of the disease.

True papules of variola may nearly always be discovered, if carefully looked for upon the forehead and wrists at the end of the second or upon the third day. They were present in all the cases which came under my own observation. In the most malignant form—*purpura variolosa*—the rapidly extending ecchymoses soon hide them, and it may be difficult or impossible even to feel them; indeed, in several instances, I could not, *post mortem*, convince myself of their presence. In the other variety, *v. hæmorrhagica pustulosa*, the eruption comes out as usual, the extravasations occurring eitherin the vesicular or pustular stage.

Hæmorrhage from the *mucous membranes* takes place in the majority of cases, and constitutes one of the most prominent symptoms.

Epistaxis is common, especially in the early stage of the disease.

Hæmatemesis occurs in more than half of the cases. In my experience it is not copious, but the blood is mixed with the thick mucus brought up in the constant attacks of vomiting.

Melæna was noticed in about one-third of the cases; the blood in three was tolerably fresh and bright; as a rule, however, it was dark, and mixed with the mucous discharges.

Hæmorrhage from the *urinary passages* occurred in a large proportion of the cases, and was often profuse, the blood coagulating in the chamber-pot.

Metrorrhagia is stated to be exceedingly common in women. It was only noticed in one out of six females.

Hæmoptysis occurred in five cases, in one it was profuse and arterial. The sputa hawked up are frequently streaked with blood from the bronchial tubes and fauces.

These hæmorrhages from the mucous membranes do not

always occur. In five of my own cases (Nos. 16, 18, 20, 22, 23,) they were absent, and yet these were among the most severe and rapidly fatal cases of the disease, death ensuing on the 5th, 5th, 6th, 7th and 4th days respectively. In two, (Nos. 22, 23) *post mortem* examination revealed extensive hæmorrhages into the mucous membrane of the stomach, intestines, and urinary tract.

The *pulse* in the first days of the disease ranges from 110 to 120 beats in the minute, and is full and compressible. Gradually the arterial tension is increased, the pulse becomes more rapid, 120 to 140, small, hard, and irregular, and at last uncountable or imperceptible.

The *respirations* are unusually increased in frequence in the early stage, without any discoverable disorder in the lungs, and are out of proportion to the intensity of the fever. In the case of a negro whose respirations the morning after admission were 32, and the temperature 101°, after examining the lungs and finding nothing to account for the acceleration, my suspicions were aroused, and on careful inspection I was able, even on the dark skin, to detect the hæmorrhagic condition in and about the papules. This symptom alone directed my attention to his dangerous condition, which might otherwise have escaped observation, as there were no hæmorrhages from the mucous membranes. An interesting, and by no means unfrequent phenomenon, was the disturbance in the respiratory rhythm, first drawn attention to by Drs. Cheyne and Stokes, consisting in a series of superficial respirations, sometimes almost imperceptible, followed by a deep inspiration. This was noticed chiefly during the last 24 or 36 hours of life.

A short hacking cough was not an uncommon symptom. Many of the patients complained of sore throat, which, in some instances, appeared to be due to the constant gagging and vomiting, in others to a foul, horribly fœtid, diphtheritic pharyngitis.

Consciousness is commonly retained until near the end. In only six cases was delirium a prominent symptom. A hyperæsthetic condition of the skin, mentioned by Zulzer* as common, was not noticed in any of the cases.

Loc. Cit.

In the true petechial form the patients seldom outlive the sixth or seventh day; where the hæmorrhages do not come on until the vesicular stage, they of course last longer. The cases upon which this paper is based died on the following days:

1 on the 3rd day; 2 on the 4th day; 5 on the 5th day; 6 on the 6th day; 5 on the 7th day; 4 on the 8th day; 4 on the 9th day.

The disease, in both its forms, is spoken of as invariably fatal, and such has been our experience in the small-pox department of the General Hospital.

Diagnosis.—In an epidemic of small-pox characterized by the presence of hæmorrhagic varieties, there is rarely any doubt of the nature of a case of fever presenting extensive cutaneous extravasations, and, perhaps, mucous hæmorrhages. Given, however, an individual case, when no epidemic was raging, and the matter would not be so easy.

We must be careful, in the first place, to remember that the initial rashes, which so often precede the milder forms of the disease, may be general and purpuric, closely resembling, or identical in appearance with, those accompanying the true petechial variety. It might be impossible to decide definitely for 24 hours on the nature of a case of this kind, In the latter the erythema would probably be more intense, the ecchymoses more extensive, and the general symptoms more aggravated. In many instances the progress of the case would alone determine its nature.

The bright, rosy-red, rash appearing on the second day might be mistaken for the eruption of scarlet fever, unless the mode of onset of the disease had been carefully watched. The diagnosis between hæmorrhagic scarlatina—fortunately a rare disease—and petechial small-pox offers still greater difficulties. Close inspection might discover in the latter papules about the forehead or wrists, and, I think, the characteristic odour of small-pox, which is well developed in this variety, would aid in arriving at a conclusion.

Cerebro-spinal meningitis is another disease which, in some of its forms, is apt to be confounded with purpuric variola. The pains in the head and back in the latter simulate those of

meningitis, in which disease also cutaneous ecchymoses not unfrequently occur. Indeed, I have the permission of the physician in charge to state that in case 25 on the list the error in diagnosis was made. I remarked to him at the *post mortem* examination upon the similarity of the pathological changes to those in hæmorrhagic variola. The mother, who had nursed the child, a short time subsequently took small-pox, and died.

With true *Purpura hæmorrhagica* —the *Morbus maculosus Werlhoffii*,—this variety of small-pox has many points in common. In both there are cutaneous and mucous hæmorrhages, but in the former the extravasations begin on the lower extremities, the skin is not so hyperæmic, the fever not so high, and there may be œdema about the joints, diarrhœa, and ascites.

Etiology.—From the table subjoined some interesting facts with reference to the general etiology of the disease may be drawn.

It is most common between the ages of 15 and 30. Thus of the cases there were—

Under 10 years, 3 ; between 15 and 20, 4 ; between 20 and 25, 9 ; btween 25 and 35, 6 ; between 35 and 45, 3 ; above 50, 1.

Young, vigorous, muscular persons form the majority of the victims, and this remarkable fact was noticed also in the late epidemic in Germany. (Zulzer, Ponfick). Several of my patients were above the average muscular development, most of them belonging to the artizan class. The predisposing causes mentioned by Aikman,* viz., sudden change of residence, debilitating nervous influences, unhealthy dwellings, were not speciallyobserved.

Men appear to be more frequently attacked than women.

With regard to vaccination the table shows that 14 were unvaccinated, while 13 showed marks of a by-gone vaccination. In none was there a history of re-vaccination. That is, the whole of these cases were unprotected, for I hold that we have no right whatever to say that a man is *vaccinated* because he has cicatrices on his arm. The proof that these 13 were not vaccinated lies in the fact that they died of the worst form of small-pox. No properly *vaccinated* person, one in whose tissues the impress of vaccina persists, can, I maintain, take small-pox.

Similarly Zulzer's† cases, 35 in number, all showed scars,

* *Glasgow Medical Journal*, 1871, p. 60. † Loc. Cit.

but none of them had been re-vaccinated. Other observers state that persons without cicatrices of a former vaccination form the majority, or even all of the number attacked.

The proportion of hæmorrhagic cases has been unusually large in this epidemic, not only here but in other parts of the world ; indeed, it has been the most virulent type of small-pox known since the beginning of the century.

In the small-pox department of the Montreal General Hospital there were admitted from Dec. 14th 1873, to July 21st 1875, one year and seven months, 260 cases. Of these 24 died of the variety under consideration, or 9.23 per cent.

Case.	Age.	Sex.	Unvac.	Vac.	Day of Death.	REMARKS.†
1	27	F.	.....	V^*_1	8th	Delirium. Hæmatemesis.
2	28	F.	.....	V_2	6th	Epistaxis. Melæna. Hæmoptysis.
3	29	M.	Unv.	....	8th	Delirium. Melæna.
4	53	M.	.....	V.	3rd	No papules evident. Died 3½ hours after admission.
5	20	F.	Unv.	....	6th	Epistaxis two days before. Slight convulsions.
6	19	M.	.....	V_2	7th	Hæmaturia.
7	35	M.	.....	V_2	9th	Much Delirium. var. hæm. pust. No mucous hæmorrhages.
8	20	M.	.....	V.	6th	Delirium. Melæna, frequent.
9	19	M.	Unv.	....	7th	Hæmatemesis. Melæna.
10	24	M.	Unv.	....	8th	Epistaxis. Melæna. Hæmatemesis.
11	25	M.	Unv.	....	9th	Var. hæm. pustulosa. Hæmoptysis. Old lung disease.
12	..	F.	.....	V_2	8th	Hæmaturia. Melæna. Hæmoptysis.
13	23	M.	.....	.	7th	Epistaxis. Hæmoptysis.
14	22	M.	.....	V_2	4th	Hæmaturia. Hæmoptysis. Melæna.
15	20	M.	.....	V_2	9th	V. hæm. pustulosa. Hæmaturia. Hæmatemesis.
16	21	M.	.....	V_1	5th	No mucous hæmorrhages.
17	19	F.	Unv.	....	9th	V. hæm. pustulosa. Hæmaturia Hæmatemesis.
18	44	M.	Unv.	....	5th	No mucous hæmorrhages.
19	24	M.	Unv.	....	5th	Hæmaturia. Metrorrhagia.
20	36	M.	.....	V_1	6th	Delirium. No mucous hæmorrhages.
21	6	M.	Unv.	....	4th	Hæmaturia. Hæmatemesis Melæna.
22	35	M.	.....	V.	7th	Delirium. No mucous hæmorrhages.
23	16	M.	Unv.	....	4th	No mucous hæmorrhages.
24	30	M.	Unv.	....	7th	Hæmaturia. Hæmatemesis. Hæmoptysis.
25	4	F.	Unv.	....	6th	Hæmatemesis.
26	36	M.	Unv.	....	6th	Hæmaturia. Melæna
27	6	M.	Unv.	....	5th	Hæmaturia. Hæmatemesis.

* The figures indicate the number of scars.
† Cutaneous extravasations occurred in all.

Pathology—The condition of the internal organs in this disease has received a good deal of attention within the past few years. The remarks which I shall here make are based upon seven carefully performed autopsies.*

The prominent characteristics in all were the hæmorrhages into the various tissues and organs.

The *blood* during life was carefully examined in six cases, but no change of importance noticed in the corpuscles. Post mortem it was dark in colour and generally fluid.

In the *meninges* of the brain scattered ecchymoses were noticed in five instances. The venous sinuses of the dura mater and the vessels of the pia mater were full. In cases 21 and 22 thin coagula of blood existed on the surface of the pia mater. The *brain* appeared normal, the consistence remarkably good. In case 22 there was a small clot in the right ventricle. The *spinal cord* was examined in one instance, when nothing abnormal was found.

On the *pericardium* maculæ were present, often quite large on the visceral layer along the tract of the coronary vessels. The *heart* substance was firm, dark in colour; in several instances minute ecchymoses were observed on the endocardium, and in the muscular walls.

Both visceral and parietal layers of the *pleura* contained ecchymoses in 6 cases. The *lungs* were crepitant, and contained much blood in the posterior parts. In case 23 there was a patch of catarrhal pneumonia. In five instances apoplectic spots were found, none of them larger than a walnut.

The *spleen* in all was firm, about the natural size, in two a little enlarged. On section the substance was compact, smooth, of a dirty-purplish red colour, and in six of the cases the Malpighian corpuscles were remarkably enlarged, appearing as round white bodies on the dark background of the pulp.

The *kidneys* appeared of normal size. Ecchymoses on the capsule common; in one instance a thin clot existed upon the organ. The consistence of parenchyma was good. In three cases minute hæmorrhages had taken place into the substance. The vessels as a rule were full. The *pelves* of the kidneys in

* For two of these I have to thank Sister Rosalie, apothecary at the R. C. Civic Small-pox Hospital, who kindly informed me when any of these cases occurred.

four instances were plugged with dark clots, which extended up into the calyces, and down the ureters. In all ecchymoses were present on the mucous membrane. In the mucous membrane of the *bladder* small hæmorrhages were met with on five occasions. In case 21 the walls of the whole organ were uniformly infiltrated with blood, not a trace of normal tissue could be seen on section.

The liver in five cases was of normal size, unusually dense and firm, lobules moderately distinct, of natural colour, and contained a good deal of blood. In two cases it was large, pale in colour, very friable, and on examination proved fatty. The general condition in both these cases accounted for the state of the liver, one had suffered from chronic disease of the leg, the other was a drunkard. Ecchymoses upon the capsule were common.

The mucous membrane of the *stomach* in all the cases showed an enormous number of extravasations, some small and capillary, others as large as a bean, and projecting on the surface. Similar appearances were found in the *small intestines*; in two instances the ecchymoses were most abundant in the ileum, in the others the upper region of the bowel was most affected. Peyer's glands were swollen and prominent in four instances. In the *large bowel* the extravasations were only noticed in three cases.

In two instances the *mesenteric glands* were uniformly infiltrated with blood, looking like dark-purple grapes. Extravasations occurred in all the cases in the *retro-peritoneal tissues*, about the aorta, along the iliac arteries, and about the lumbar nerves. In most they were small and confined to the adventitia and parts about the vessels, in one, however, quite a large suggillate was found in the region of the right psoas muscle. Similar appearances were noticed twice about the thoracic aorta.

Such are the chief pathological changes in the internal organs, and they correspond pretty closely to those described by Ponfick* in the Berlin epidemic. In addition to the hæmorrhages, the firm, dense condition of the heart and abdominal glands seems peculiar, and stands in marked contrast to the appearances of these organs in variola vera, in which they are swollen, soft

* Berliner klinische Wochenschrift, 1872.

and friable, and in that state of cloudy swelling common to prolonged fever. So impressed is Ponfick with the pathological and clinical differences between these extremes of small-pox, that he is inclined to group them as distinct diseases. But, just as transitions are met with clinically between the macular hæmorrhagic form and that in which extravasations take place in the vesicular and pustular stages, so also, I think, in a more extended series of post mortems appearances would be found intermediate between the extremes, and where the disease had lasted any time the same pyrexial changes would occur. Indeed, Curschmann* states that he has noticed them in *variola hæmorrhagica pustulosa.*

On the intimate pathology of this disease I can offer no suggestion. We are, as yet, profoundly ignorant of the conditions of its genesis, and do not know whether it depends on the intensity of the poison or the extreme susceptibility of the patient.

Most histologists are agreed that in these purpuric disorders the red corpuscles pass through altered or thinned and not ruptured vessels, but as to the causes of this general *diapedesis*, as the process is called, we have no data upon which to form a judgment.

The *treatment* of the disease is eminently unsatisfactory, the patients almost invariably die. A few instances are recorded of recovery from variola hæmorrhagica pustulosa. All the usual medicines indicated under these circumstances were tried, gallic acid, ergot, turpentine, acetate of lead, &c., without the slightest benefit. Quinine was used in large doses, and in three cases I used the cold pack.

Since the closure of the wards I have met with an article in the *Glasgow Medical Journal* by Mr. Aikman, formerly assistant medical officer at the Hampstead Small-pox Hospital, in which he recommends strychnia in large doses, and states that under this treatment many of these cases recovered. He gives as much as a drachm and a half of the liquor strychniæ in the twenty-four hours in severe cases, combined with iron and quassia.

* Ziemssen's Encyclopedia, Vol. II., Art. Small-pox. p. 387.
† Loc. Cit.